

Moumita Sen Sarma

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Education

- **Kansas State University, USA** 2024 - Present
PhD in Computing Science (*All But Dissertation - ABD*)
- **Chittagong University of Engineering & Technology (CUET), Bangladesh** 2016 - 2021
B.Sc. in Computer Science & Engineering
CGPA: 3.89 out of 4.00 | Departmental Merit Position: 1st / 120

Experience

- **AI Consultant** June 2026 - Present
K-State AI Consultation Services (KAICS)
Kansas State University, USA
Provide research-oriented AI consultation to faculty, staff, and graduate students, and develop tutorials on emerging AI topics, tools, and technologies.
- **Graduate Research Assistant** Aug 2024 - May 2026
Data Semantic Lab
Kansas State University, USA
Conducted research under the Game-changing Research Initiation Program (GRIP), contributing to the project "Towards a Global Food Systems Data Hub: Seeding the Center for Sustainable Wheat Production."
- **Lecturer** Jul 2022 - Jul 2024
Department of Computer Science & Engineering
Chittagong University of Engineering and Technology (CUET), Bangladesh
Courses: Software Engineering, Computer Graphics, Programming for Planners, Electrical Device and Circuits
- **Lecturer** Sept 2021 - Jul 2022
Department of Computer Science & Engineering
East Delta University, Bangladesh
Courses: Computer Graphics, Digital Image Processing, Pattern Recognition, Compiler Design, Object Oriented Programming and Operating System

Research Interest

•Artificial Intelligence •Deep Learning •Computer Vision •Explainable AI •Neurosymbolic AI

Publications

- **Do CNNs Internally Represent Real and Fake Images Differently? A Hidden-Layer Analysis (Accepted)** 2026
M. S. Sarma, Pascal Hitzler, Eugene Y. Vasserman
20th Conference on Neurosymbolic Learning and Reasoning (NeSy 2026)
- **Neurosymbolic Hidden Neuron Analysis in Convolutional Neural Networks (Accepted)** 2025
Abhilekha Dalal, M. S. Sarma, Avishek Das, Samatha E. Akkamahadevi, Eugene Y. Vasserman, Pascal Hitzler
Neuro-Symbolic AI: Bridging the Gap Between Neural Networks and Symbolic Reasoning
Elsevier (Book Chapter, submitted)
- **A Symbolic Reasoning Methods in Neural Architectures and Large Language Models (Accepted)** 2025
Adrita Barua, Avishek Das, M. S. Sarma, Pascal Hitzler
Neuro-Symbolic AI: Bridging the Gap Between Neural Networks and Symbolic Reasoning
Elsevier (Book Chapter, submitted)
- **AVaTER: Fusing Audio, Visual, and Textual Modalities Using Cross-Modal Attention for Emotion Recognition** 2024

Avishek Das, M. S. Sarma, Mohammed Moshikul Hoque, Nazmul Siddique, M Ali Akber Dewan
Sensors, vol. 24, p. 5862, 2024, doi: <https://doi.org/10.3390/s24185862>

- **Multi-Person Pose Estimation Using Group-Based Convolutional Neural Network Model** 2023
S. S. Aonty, K. Deb, M. S. Sarma P. K. Dhar and T. Shimamura
IEEE Access, vol. 11, pp. 42343-42360, 2023, doi: 10.1109/ACCESS.2023.3271593
- **Jointly Learning Structure for Human Pose Estimation using Convolutional Neural Networks** 2022
S. S. Aonty, M. S. Sarma and K. Deb
4th International Conference on Electrical, Computer & Telecommunication Engineering (ICECTE), Bangladesh, 2022, pp. 1-4, doi: 10.1109/ICECTE57896.2022.10114551
- **Traditional Bangladeshi Sports Video Classification Using Deep Learning Method** 2021
M. S. Sarma, K. Deb, P. K. Dhar, and T. Koshiba
Applied Sciences, vol. 11, no. 5, p. 2149, Feb. 2021, doi: 10.3390/app11052149
- **BMGC: A Deep Learning Approach to Classify Bangla Music Genres** 2021
M. S. Sarma, A. Das
4th International Conference on Networking, Information Systems & Security, NISS2021, Association for Computing Machinery (ACM), doi: 10.1145/3454127.3456593
- **Traditional Bengali Food Classification Using Convolutional Neural Network** 2021
A. M. Uddin, A. Al Miraj, M. S. Sarma, A. Das and M. M. Gani
2021 IEEE Region 10 Symposium (TENSYP), pp. 1-8, doi: 10.1109/TENSYP52854.2021.9550874

Poster Presentation

- **A Case Study on Concept Induction for Neuron-Level Interpretability in CNN** [View Poster] 2025
M. S. Sarma, S. E. Akkamahadevi, P. Hitzler
13th International Conference on Knowledge Capture (K-CAP 2025), USA.
- **Building Knowledge Graph for Fungicide Management in Wheat** [View Poster] 2025
M. S. Sarma, A. Gautam, N. Gelal, et al.
Posters, Pinot and Partnership Session on Enabling Technologies and Global Food Security and Biosecurity, Kansas State University, USA.

Honors & Awards

- **Graduate Student of the Month** Sept 2025
Carl R. Ice College of Engineering, Kansas State University, USA

Technical Skills

Programming: Python, C/C++, Java, SQL	LLMs & RAG: Hugging Face, OpenAI API, RAG, GraphRAG, Transformers
ML Frameworks: PyTorch, TensorFlow, Scikit-learn	Knowledge Graphs: Neo4j, RDF, OWL, SPARQL, Protégé
Vision & GenAI: CNNs, SDXL, FLUX, Diffusion	Databases: Qdrant, GraphDB, MySQL
Explainable AI: Concept Induction, ECII Tool	Tools & MLOps: Docker, Kubernetes, Git, FastAPI

Internship & Training

- Brain Station 23 Ltd. Aug 2019 – Sept 2019
Key Achievements:
 - Learned about Python, Django, D3.js, Git
 - Completed a project on University Enrollment Log System using Python, Django

Projects

- **Hybrid RAG for Knowledge-Grounded Cyber Threat Intelligence** » [GitHub] » [Live App]
 - A hybrid RAG system that answers cyber threat intelligence questions that combines knowledge-graph retrieval, semantic vector retrieval, and LLM-based generation.
 - Built a cyber threat knowledge graph from MITRE ATT&CK and CISA KEV, linking threat groups, attack techniques, software, campaigns, vulnerabilities, and mitigations.

- Implemented entity resolution, evidence provenance, citation validation, and retrieval/output guardrails to support grounded and traceable question answering.
- Exposed the question-answering and retrieval capabilities through MCP and deployed an interactive Streamlit application.
- **Technology/Tools:** *Python, OpenAI GPT-5.6, Neo4j, Qdrant, MCP, Streamlit, MITRE ATT&CK, CISA KEV, STIX, Sentence Transformers*
- **Image Caption Generation** » [Github]
 - An automatic image caption generation system with a web UI generating a caption to the images provided by the user
 - **Technology/Tools:** *HTML, CSS, Flask, Keras, Tensorflow, Deep Learning*
- **Bengali Sports Classification** » [Github]
 - A CNN and LSTM based Bengali sports classifier web UI for classifying five traditional sports activities from video.
 - **Technology/Tools:** *Deep Learning, Tensorflow, Keras, Flask, HTML, CSS*
- **Coursera Guided Projects:** » [Github]
 - Object Localization:** Developed a CNN that is trained to classify and localize emojis in images
 - Neural Style Transfer:** Utilized pretrained CNN to create an artistic style image from content and given style image
 - Creating Multi-Task Models:** Created a multi-output model, trained to learn and predict digit and color values of handwritten digits
 - **Technology/Tools:** *Deep Learning, Keras, Tensorflow, Pytorch*

Online Course Certifications

- Machine Learning in Production (DeepLearning.AI)
- Crash Course: Docker For Absolute Beginners (KodeKloud)
- Crash Course: Kubernetes For Absolute Beginners (KodeKloud)
- Coursera Build Basic Generative Adversarial Networks (GANs)
- Coursera Machine Learning Course
- Coursera Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning Course
- Coursera Convolutional Neural Networks in TensorFlow Course
- Dataquest – Data Analyst in Python Course, Data Scientist in Python Course, Data Engineer Course
- IBM & The Coding School's Introduction to Quantum Computing Course

Workshops Attended

- Sixty Hour Workshop on Machine Learning and Artificial Intelligence Fundamentals with Python organized by ICT Division of Bangladesh Govt.
- Workshop on Ethical Hacking & Blockchain
- Workshop on Android Controlled Robot
- Daylong Workshop on Raspberry Pi

Cocurricular & Leadership Activities

- **Vice President**, Computer Science Graduate Student Association (CS-GSA), Kansas State University, USA 2026
- **Volunteer** at Kansas State University Career Fair, USA 2025
- **Moderator (As a Faculty)** at IEEE CUET WIE Affinity Group Student Branch, Bangladesh (2023 - 2024)
- **Organizing Member** at Workshop on Computational Linguistics and Bangla Language Processing (CLBLP – 2023)
- **Organizing Member** at Intl. Conference on Electrical, Computer and Communication Engineering (ECCE – 2023)
- **Volunteer** at Intl. Conference on Electrical, Computer and Communication Engineering (ECCE – 2019)
- **Chairperson** at IEEE CUET WIE Affinity Group Student Branch, Bangladesh (2019 - 2020)
- **Membership Advisor** at IEEE Student Branch CUET, Bangladesh (2018 - 2019)